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Bio-Inspired MEMS Direction Finding Underwater Acoustic Sensor Operating in Neutral-Buoyant Configuration

McCarty, Leland; Park, Jaehyun; Alves, Fabio; Karunasiri, Gamani

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Chair: Roger Proksch, Asylum Research

Abstract: G10.00004 : Bio-Inspired MEMS Direction Finding Underwater Acoustic Sensor Operating in Neutral-Buoyant Configuration*

← *Abstract* →

Presenter:
Leland McCarty
(The Naval Postgraduate School)

Authors:
Leland McCarty
(The Naval Postgraduate School)

Jaehyun Park
(The Naval Postgraduate School)

Fabio Alves
(The Naval Postgraduate School)

Gamani Karunasiri
(The Naval Postgraduate School)

MEMS acoustic sensors were developed based on the mechanically coupled auditory structure of the *Ormia Ochracea* fly in order to enhance underwater directional sound-sensing technologies. MEMS directional acoustic sensors consists of two wings connected by a bridge in the middle. The entire mechanical structure is connected to a substrate using two torsional legs. The mechanical vibrations under sound excitation is transduced to an electrical signal using interdigitated comb finger capacitors attached to the edges of the wings. This presentation covers the design, fabrication, and characterization of *Ormia*-based MEMS directional acoustic sensor operated underwater as an inertial sensor. The sensors were designed using FE modeling tools and fabricated using commercially available MEMSCap SOIMUMPS processes. Characterization was performed in air and underwater, showing the predicted frequency and directional responses. For underwater operation, the sensors were housed in a near-neutral-buoyant, hermetically sealed enclosure. Results indicate that the MEMS acoustic sensor's microphone characteristics are preserved when operated as accelerometers, and they have a great potential to be used for underwater applications in a neutral-buoyant configuration.

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